

EXHIBIT 61

Summary of Qualifications

My name is Donald I. Siegel. I am an expert in the field of hydrogeology and have been retained by the Plaintiffs in this case to evaluate and provide opinions regarding Perfluorooctanoic Acid (PFOA) contamination of groundwater in North Bennington, Vermont. Specifically, in this report, I have been asked to provide an opinion regarding the scientific development and knowledge of the environmental migration pathways of PFOA.

I am a partner at Independent Environmental Scientists, Inc., of Manlius, New York, and also serve as Professor of Earth Sciences at Syracuse University. I earned a BS in Geology from the University of Rhode Island, an MS in Geology from Pennsylvania State University, and a PhD in Hydrogeology from the University of Minnesota. After my studies for my PhD degree, I was employed by the United States Geological Survey as a hydrologist and geochemist, after which I joined Syracuse University. There, I have taught courses at the graduate level in hydrogeology, groundwater modeling, aqueous geochemistry and contaminant hydrogeology. A copy of my C.V. is attached to Siegel (2017).

Beyond my service to Syracuse University, I have served as Chairman of the Hydrogeological Division of the Geological Society of America (GSA), which awarded me the following professional honors related to my expertise in hydrogeology and water chemistry: the Birdsall-Dreiss Distinguished Lectureship (1992-1993); GSA Distinguished Service Award (2001); and the O.E. Meinzer Award in Hydrogeology (2005).

I have also served on many National Research Council Committees (as part of the National Academy of Sciences and Engineering), and have Chaired its Water Science and Technology Board. I have served as Associate Editor of the following publications: Water Resources Research, Wetlands, Ground Water, Geology, The Hydrogeology Journal, Hydrologic Processes, and edited books for the publishing arm of the Geological Society of America. I have published over 160 peer-reviewed research papers and books, on topics spanning the

breadth of the hydrogeologic sciences, from contaminant geochemistry to wetland hydrology.

I have also been retained by governmental bodies, industry, insurance companies, and private citizens to provide my scientific expertise on a broad range of hydrogeologic issues, including: contamination from solvents, hydrocarbon and salt spills, landfill siting and contaminant characterization; water supply issues; fugitive gas and vapor intrusion problems; and wetland issues. I have been asked to testify to the U.S. Congress on wetland issues and, most recently, on hydraulic fracturing of rocks to obtain hydrocarbons.

My record of court testimony from 2012 to 2017

1. Deposition: Multiple Parties Versus Anschutz, Big Flats, New York, Federal Court, State of New York, 2014.
2. Trial testimony: State of New York, County of Cayuga, Supreme Court, Doris Baity, et. al. Plaintiffs versus General Electric, Auburn NY, April-May 2012

I reserve the right to modify this report and the professional opinions contained herein upon review of additional or supplemental information or data.

My fees are \$300/hr. for provided expertise in evaluating the source of PFOA in the North Bennington area, the subsurface hydrogeology and PFOA transport.

A handwritten signature in black ink, appearing to read "Donald Siegel", written over a horizontal line.

Donald Siegel, Ph.D.
Professor of Hydrogeology

1.0 Summary of Opinions

I incorporate herein by reference my September 1, 2017, class certification report and the opinions contained in that report. Based on my review of documents referenced in this report and my class certification report, and my experience and education, and my review of the merits expert report of Dr. Philip K. Hopke, to a reasonable degree of scientific certainty, I express the following opinions:

1. The industries involved in the manufacturing and use of per and poly-fluorinated hydrocarbons, including PFOA, knew for decades that fluorinated hydrocarbons were released to the atmosphere during chemical production and use.
2. The industries involved in the manufacturing and use of PFOA were aware that PFOA would disperse widely in the atmosphere once released. The dispersion, solubility, and distribution of fluorinated compounds in the atmosphere were common knowledge by the 1970s.
3. The industries involved in the manufacturing and use of PFOA were aware of the high solubility of PFOA and the likelihood that PFOA was present in precipitation downwind of manufacturing facilities since at least 2002 when the United States Environmental Protection Agency (USEPA) released the widely circulated Revised Draft Hazard Assessment of Perfluorooctanoic Acid and Its Salts (USEPA, November 2002). It was abundantly clear by 2003 when air distribution of PFOA was conclusively linked to distant groundwater contamination at the E.I. DuPont de Nemours plant in Parkersburg, WV. The plant manufactured PTFE dispersions containing PFOA used by ChemFab/Saint-Gobain Performance Plastics.
4. PFOA deposited with precipitation on the land surface would reach the aquifer used for domestic drinking water within about 5 years from initial time of deposition in most of the North Bennington area where the water table is

relatively shallow. Where the water table is relatively deep (~20-30 feet), the time of travel would be on the order of about 10 years.

2.0 Groundwater Contamination from Atmospheric Release of Fluorinated Hydrocarbons

For at least 50 years, scientists, industry and regulatory agencies knew that fluorinated hydrocarbons disperse atmospherically and are sufficiently non-degradable and soluble to enter and persist in water in streams, lakes and groundwater. The scientific literature has long documented this fact. For example, chlorofluorocarbons (CFCs) lost from refrigeration and other uses from the 1950s through the 1980s literally have been used to age-date water soon after Lovelock and Ferber (1982) showed that these compounds serve as ideal tracers because they minimally degrade or chemically react with substrates with which they come into contact (see Plummer and Friedman, 1999 and references cited therein for a review <https://pubs.er.usgs.gov/publication/fs13499>). Similarly, perfluorooctanoic acid (PFOA) degrades little and persists in the environment once released to the atmosphere.

PFOA was originally manufactured by the 3M Company since the 1950s and used by E. I. du Pont de Nemours (Dupont), among other companies, to produce PTFE (Teflon™) dispersions used by ChemFab/Saint-Gobain in its coating operations in Bennington and North Bennington, Vermont since 1968. The chemical and transport properties of PFOA are reasonably similar to those of their shorter molecular weight fluorinated hydrocarbon cousins, and by analogy, it would have been apparent that PFOA would have the ability to be dispersed in atmospheric plumes to surface soils when released to the atmosphere during manufacturing processes.

In addition, ChemFab/Saint-Gobain knew or should have known about the emissions of PFOA from its processes. I have reviewed the merits expert report of Dr. Philip K. Hopke concerning the knowledge of ChemFab/Saint-Gobain about air emissions of PFOA from the Bennington and North Bennington plants and rely upon his report, in part, for my opinions.

Evidence that PFOA dispersed to the atmosphere and then contaminated groundwater consumed by people, first came to the U.S. Environmental Protection Agency's (EPA) attention at DuPont's Washington Works facility in Parkersburg, West Virginia. There, as early as the 1980's, PFOA had been measured in nearby consumed groundwater (reviewed by Paustenbach et al. 2007; DuPont Internal Memoranda 1984-1988).

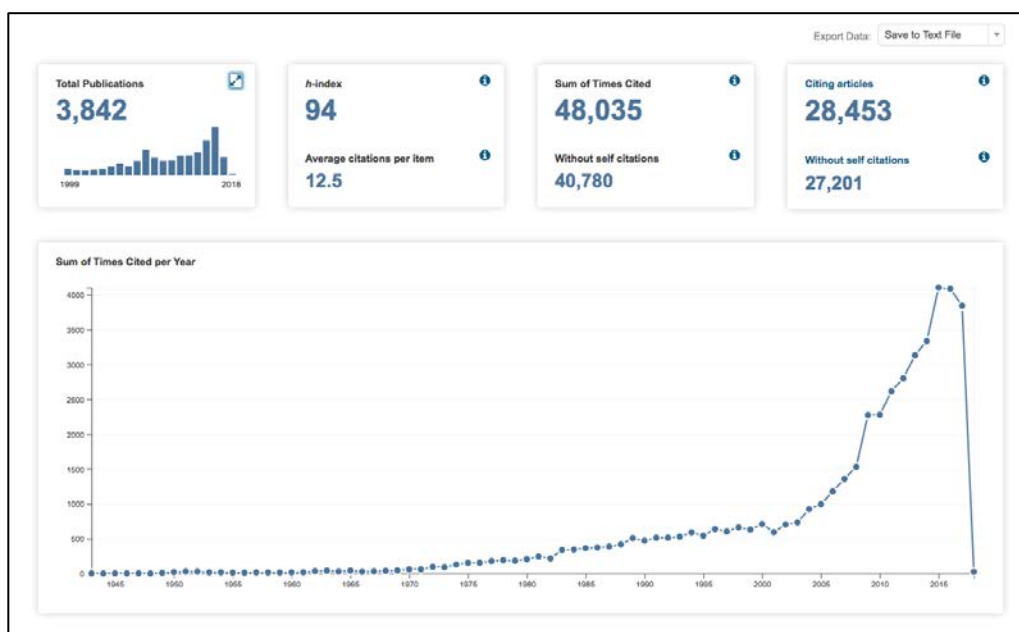
Plaintiffs filed a class action lawsuit in 2001 against DuPont because of the contamination (Jack W. Leach v. E.I. du Pont de Nemours & Co., Civil Action No. 01-C-608, Wood County, West Virginia, Circuit Court) and the EPA followed suit with an administrative action. In 2002, DuPont agreed with USEPA that PFOA identified in groundwater was released by the facility as an atmospheric contaminant, which migrated to groundwater when they agreed to Paragraph 12 of the consent order: "The C-8 discharged by the facility is a contaminant present in or is likely to enter a PWS (Public Water Supply) or an USDW (Underground Source of Drinking Water) through the migration from air emissions, surface water discharges or from unlined landfills". (Order on Consent, In the Matter of E.I. du Pont de Nemours and Company, Inc., Washington Works Facility, EPA Docket Nos. SDWA-03-2002-0019, SDWA-05-2002-0002, March 4, 2002).

A 2001 consent order between E.I. du Pont de Nemours & Co. (DuPont) and the West Virginia Department of Public Works (WVDEP), the West Virginia Department of Health and Human Resources-Bureau for Public Health (WVDHHRBPH) ordered the formation of an expert scientific committee called the Groundwater Investigation Steering Committee (GIST). GIST evaluated C-8 groundwater contamination in the area around DuPont's West Virginia C-8 plant and summarized their findings in the "Ammonium Perfluorooctonate (C-8) Groundwater Investigation Steering Team Report (2003). They concluded that, *"It is believed that the C-8 levels are transported from the DuPont Washington Forks Facility via air emissions. Please note that C-8 transported in air emissions and deposited on surfaces is likely to be mobilized by precipitation and migrate via water transport to surface and/or groundwater."* This report was a publicly available

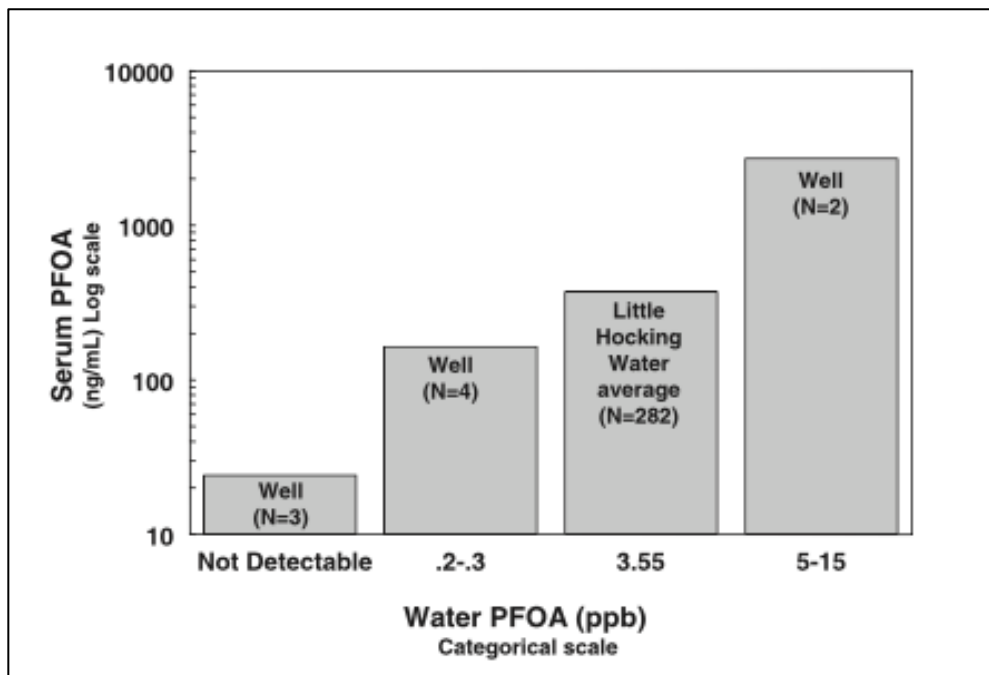
document. (https://dep.wv.gov/WWE/watershed/wqmonitoring/Documents/C-8/C-8_GISTreport.pdf).

A simple review of the scientific citation index (Figure 1; Web of Science; <https://clarivate.com/products/web-of-science/>) using a title search for the words PFOA, APFO, perfluorooctanoic acid and C8 resulted in 3,842 citations with a dramatic increase between 2000 and 2002 when PFOA was added to the list of compounds under investigation by the USEPA under the Toxic Substances Control Act (TSCA) Forty-Sixth Report of TSCA (December, 2000), and again in 2002 when the USEPA released the Revised Draft Hazard Assessment of Perfluorooctanoic Acid and it's Salts (USEPA, 2002).

Figure 1. Number of times PFOA was cited in publications, by year.



Atmospheric distribution of PFOA was confirmed by Emmett, et. al. (2006) who applied an atmospheric dispersal model to estimate the PFOA plume from the Dupont chemical plant in West Virginia.

Figure 2. Concentration of Serum PFOA v. Water PFOA (Emmett, 2006)

Emmett found that “Where the primary drinking water source was well water, serum PFOA levels varied in proportion with well water PFOA levels.” (Emmett, et. al., 2006) also found that “Serum PFOA levels were similar whether residents lived in the area proximate to the plant where the air plume would have been concentrated, or in an area that had the same water service but was located up to 20 miles from the plant and where air pollution with PFOA was estimated to be minimal.” Barton et. al. (2006) characterized ambient air concentrations of PFOA at the fence-line of the Washington Forks, West Virginia plant and found that primary direction of transport of PFOA was in the prevailing wind direction. Barton (2008; Barton et. al., 2010) confirmed the deposition of PFOA on vegetation and ground surfaces downwind of its point of emission.

All parties, including the West Virginia Department of Environmental Protection (WVDEP) and DuPont, concluded that DuPont’s PFOA contamination largely derived from dry and wet emissions from the plant, deposited as plumes with precipitation on the ground to later infiltrate to the groundwater aquifer used by multiple towns miles away from the

plant (Paustenbach et al. 2007; WVDEP, 2003). DuPont and URS Diamond (2003) also characterized how PFOA deposited from the atmosphere does not meaningfully sorb and “stick” to soils but will continue to move downward to the water table. They also concluded that soil PFOA concentrations have less meaning with respect to determining where the plume of PFOA would move in the atmosphere compared to groundwater concentrations.

A DuPont scientist, Mark Russell produced a report for DuPont in 2002 (Russell, 2002) which modeled the transport of a “mobile, persistent” chemical along the Ohio River through the soil zone. Although PFOA was not directly mentioned, given that it was the chemical of interest along the Ohio River in the lawsuits against DuPont, I conclude that this study was done to conceptually address it. The conclusions of the work were that the PFOA would quickly, in a matter of a few years, reach the water table in even clayey soils.

ChemFab/Saint-Gobain in Bennington and North Bennington purchased PTFE dispersions containing PFOA from DuPont from 1968 to end of production in 2000. DuPont also assisted Chemfab/Saint-Gobain with air pollution controls at the two plants and provided other technical assistance. It is my professional judgment that Chemfab/Saint-Gobain either knew or should have known that PFOA emitted from their operations in North Bennington would have led to similar groundwater contamination in Bennington and North Bennington long before the widespread well contamination was first disclosed to the public in 2016.

3.0 Timing for PFOA to Have Reached the Water Table Once Emissions Began

Hydrogeologists use mathematical models to characterize and forecast fate and transport of water and contamination in the subsurface.

I used a scientifically accepted one-dimensional steady state screening approach (Rao and others, 1985, cited e.g. by Alley, 1993; Bevin and Germain, 2013) to estimate how long it would take PFOA deposited on the land surface in the contaminated zone to reach the water table. Once PFOA reached the water table, it would have contaminated the groundwater resource. The National Academy of Science (NAS, 1984) cited Rao and others (1985) model as a suitable screening tool to characterize the movement of pesticides and other contaminants through soil and I used this same model in my Class Certification Report (Siegel, 2017).

The Rao and others (1985) approach incorporates many of the same parameters applied to complex deterministic models for organic contamination (e.g. sorption, degradation, material properties and organic content of soils), but weights and averages them through unsaturated soils, rather than partitioning soils into horizons for which little direct information is known.

This timing is most sensitive to values assumed for the parameters governing sorption (“sticking”) of PFOA to soil organic matter, and the assumed depth of the water table. If the water table is closer to the land surface, contamination will reach the water table faster.

I used the chemical factor governing how much PFOA sorbs to the soils (the distribution coefficient, K_d) from a study published by Milinovic and others, (2015) which determined it directly in experiments on silty loam soil, similar to soil found in North Bennington.

PFOA does not sorb much to soils and moves essentially “conservatively” in water and it does not degrade or decompose chemically or biological in the natural environment.

The Rao et al. (1985) approach incorporates two equations, one incorporating the sorption of PFOA to soils (equation 1) and the other the transport of the major part of the mass of it to the water table from the land surface (equation 2).

$$R_f = [1 + BD * K_{oc} * F_{oc} / FC] \quad \text{equation 1}$$

Where:

R_f is the retardation factor

BD is the bulk density of the soil

K_{oc} is the organic carbon-PFOA partition coefficient (from Milinovic and others, (2015)

F_{oc} is the average fraction of organic matter in total soil thickness from the land surface to the water table, calculated from measured soil organic matter in Male (2018).

FC is the field capacity of the soil, that amount of water remaining when the soil is completely drained (as percent of total porosity).

And

$$T = L * R_f * FC / q \quad \text{equation 2}$$

Where:

T is the time in years for PFOA to have reached the water table once it was deposited on the ground

L is the depth to the water table

Rf is the retardation factor

FC is the field capacity

The soils in the Bennington area mostly consist of either sand and gravel deposited by glaciers as kame and eskers or valley fill, and silty loam covering glacial till. Table 1 shows the values I chose to constrain probable travel times for PFOA to have reached the water table through these two broad soil types.

Table 1. Values used in the transport model and results.

| | Sand and Gravel | Silty Sand | Source |
|---|-----------------------|------------|---|
| For Slowest Transport | | | |
| Water table maximum depth (ft) | 30 | 10 | Estimated from experience |
| Maximum bulk density (g/cc) | 2.2 | 2.4 | From: http://www.structx.com/Soil_Properties_002.html |
| Maximum Porosity | 0.32 | 0.49 | Source: http://www.geotechdata.info/parameter/soil-porosity.html |
| Maximum field capacity | 0.25 | 0.45 | source: https://nrcca.cals.cornell.edu/ |
| Recharge (inches) | 25 | 25 | Sources: Jerris and DeSimone (1992), Flynn and Tasker (2004) |
| Year for PFOA to get to water table after Initial Deposition | 6 | 5 | |
| For Fastest Transport | | | |
| Water table minimum depth (ft) | 5 | 5 | Estimated from experience |
| Minimum Bulk Density (g/cc) | 1.3 | 1.6 | From: http://www.structx.com/Soil_Properties_002.html |
| Minimum Porosity | 0.21 | 0.25 | Source: http://www.geotechdata.info/parameter/soil-porosity.html |
| Minimum Field Capacity | 0.15 | 0.35 | source: https://nrcca.cals.cornell.edu/ |
| Recharge (in) | 25 | 25 | Sources: Jerris and DeSimone (1992), Flynn and Tasker (2004) |
| Years for PFOA to get to water table after Initial Deposition | 2 | 3 | |
| Bulk Organic carbon derived from Male (2018) | For 5, 10 and 30 feet | | 0.008; 0.004; 0.002 |

Based on my calculations, PFOA would have reached the water table in the Bennington and North Bennington area on average within 5 years from the time it was deposited on the land surface throughout the zone of contamination. The contamination would have occurred more slowly for deeper groundwater depths and for less porous soils with higher percentages of organic matter. It would have occurred more rapidly for shallower groundwater depths with more porous soils with lower percentages of organic matter.

Equations 1 and 2 are linear algebraic expressions, and the most critical variables are percent of organic matter, recharge rate and depth to water table. Even considering the case of clayey soils with an unreasonably uniform 1% organic matter, a water table 5-feet deep and half the average recharge rate (because the soil is “tight”), the travel time for PFOA would only have doubled to about 10 years.

Barr Engineering (2017), under contract to Saint-Gobain, used a three-dimensional distributed parameter numerical computer model that also incorporated transport of PFOA from atmospheric deposition through the soil zone to the water table. They included in their presentation (Figure D12, Barr, 2017, Appendix D) their modeled concentrations of PFOA in ground water over time at selected groundwater wells within water distribution areas A and B located in the eastern third of the North Bennington area, an area within which atmospheric models of PFOA dispersion from the North Bennington and Bennington plants showed PFOA had reached through atmospheric dispersion (referenced in my Class Certification Report). They also prepared maps of simulated PFOA in groundwater over time from 1969 to 2016.

According to their simulations, PFOA would have reached the water table at most of their representative well locations by 1978, ostensibly from the Bennington Plant emissions before the North Bennington Plant was used (Figures D14, D16, D18-20). Others had initial contamination mostly in the 1980’s, a few years later. Their map renditions simulated much broader contamination east of the Water Street Plant within about 20 years of Water Street plant operation.

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